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10/686,009	10/15/2003	Benjamin Vigoda	056754/0124937	5836

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EXAMINER
WASHBURN, DOUGLAS N

ART UNIT	PAPER NUMBER
2863	

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Please find below and/or attached an Office communication concerning this application or proceeding.

H-A

## *Office Action Summary*	**Application No.** 10/686,009	**Applicant(s)** VIGODA ET AL.
	Examiner Douglas N. Washburn	**Art Unit** 2863

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *1 March 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-58* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *57* is/are allowed.

6)☒ Claim(s) *1-3, 5-13, 27, 28, 30-51, 53, 54 and 58* is/are rejected.

7)☒ Claim(s) *4,14-26,29,52,55 and 56* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *01 March 2004* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *3 March 2004*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Drawings

1 Figures 1-3 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

2 Claim 55 is objected to because of the following informalities:

Claim 55, line 11 recites, in part, "a noise-lock loop further comprising..." lacks antecedance.

Examiner suggests, "a noise-lock loop comprising...".

Claim 56 depends from claim 55.

Claim 58, line 1 recites in part, "The apparatus of claim 51, wherein...".

Examiner suggests "The method of claim 51, wherein...".

Correction is required.

Claim Rejections - 35 USC § 101

3 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 27-51, 53, 54 and 58 are rejected under 35 U.S.C. 101 because the claimed invention lacks tangible results. See MPEP 2106 [R-3] IV B (1) (b). Examiner further suggests applicant see http://www.uspto.gov/web/offices/com/sol/og/2005/week47/patgupa.htm

Claim Rejections - 35 USC § 102

4 The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-3, 5-13, 27, 28 and 38-45 are rejected under 35 U.S.C. 102(b) as being anticipated by Helfenstein et al. (US 6,282,559) (Hereafter referred to as Helfenstein).

Helfenstein teaches:

A plurality of continuous-time delay elements (delay elements; column 5, lines 40 and 41) for receiving a time-varying signal (analog signals; column 9, line 14), each of the continuous-time delay elements imposing a corresponding delay on the signal in regard to claim 1;

A plurality of continuous-time computational elements (circuit; column 5, lines 15 and 16; figure 4) for receiving delayed components of the signal from the continuous-time delay elements, the continuous-time computational elements each producing an output based on probability distributions associated with different possible states of at least one signal component (column 4, lines 4-6; figure 1) in regard to claim 1;

The signal is expressed as a probabilistic representation (column 5, lines 18-23) in regard to claim 2;

The computational elements cooperate to effect a series of computational operations on the signal components in a predetermined order (column 6, lines 39-64; figure 11), the predetermined order being enforced by the delays imposed by the delay elements (column 5, lines 40-42) in regard to claim 3;

The predetermined order corresponds to an algorithm (column 7, line 37-41) in regard to claim 5;

The algorithm is a belief propagation algorithm (column 7, line 37-41) in regard to claim 6;

The algorithm is a statistical estimation algorithm (column 7, line 37-41) in regard to claim 7;

The algorithm performs multi-user detection (column 9, line 38-41) in regard to claim 8;

The algorithm is a decoding algorithm (column 9, line 38-41) in regard to claim 9;

The algorithm corresponds to a factor graph (column 9, line 7-9) in regard to claim 10;

Inputs to the factor graph are received from the delay elements (column 5, line 40-42) in regard to claim 11;

The delay elements cause a plurality of temporally distinct signal components to reach a single computational element simultaneously (column 4, line 49-51) in regard to. claim 12;

The computational elements are arranged in a network (figure 4), and further comprising a receiving module for assigning probability values to different possible states of the signal when it arrives and communicating the probability values to at least a first computational element in the network, the computational elements producing outputs based on the probability values (column 5, lines 24-27) in regard to claim 13;

Receiving a time-varying signal (analog signals; column 9, line 14) in regard to claim 27;

Imposing a plurality of delays on the signal, wherein the delays are imposed by continuous-time delay elements (circuit; column 5, lines 15 and 16; figure 4) in regard to claim 27;

Performing state-based operations on a plurality of delayed components of the signal based on probability distributions associated with different possible states (column 4, lines 48-55) thereof in regard to claim 27;

The signal is expressed as a probabilistic representation (column 4, lines 4-6) in regard to claim 28;

The state-based operations perform a series of probability computations the signal components in a predetermined order, the predetermined order being enforced by the delays (column 5, lines 62-64; column 6, lines 3-31) in regard to claim 38;

The state-based operations correspond to an algorithm (column 6, lines 35 and 36) in regard to claim 39;

The algorithm is a belief propagation algorithm (column 9, lines 1-6) in regard to claim 40;

The algorithm is a statistical estimation algorithm (column 7, line 37-41) in regard to claim 41;

The algorithm performs multi-user detection (column 9, lines 38-42) in regard to claim 42;

The algorithm is a decoding algorithm (column 9, lines 38-42) in regard to claim 43;

The algorithm implements a factor graph (column 9, lines 33-35) in regard to claim 44;

And the delays cause a plurality of temporally distinct signal components to be operated on simultaneously (column 4, lines 4-6) in regard to claim 45.

Allowable Subject Matter

5 Claims 4, 14-26, 29 and 52 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 55 and 56 would be allowable if rewritten or amended to overcome the objection, set forth in this Office action.

Claim 57 is allowed.

The following is an examiner's statement of reasons for allowance:

Claim 4 recites, in part, "computational elements are soft gates and the computational operations are soft logic operations". This feature in combination with the remaining claimed structure avoids the prior art of record.

Claim 14 recites, in part, “at least some of the delay elements are soliton delay elements”. This feature in combination with the remaining claimed structure avoids the prior art of record.

Claim 15 recites, in part, “at least some of the delay elements conserve an amplitude of the signal components”. This feature in combination with the remaining claimed structure avoids the prior art of record.

Claim 16 recites, in part, “at least some of the delay elements are filters”. This feature in combination with the remaining claimed structure avoids the prior art of record.

Claim 17 recites, in part, “at least some of the filters are low-pass filters”. This feature in combination with the remaining claimed structure avoids the prior art of record.

Claim 18 recites, in part, “at least some of the filters are band-pass filters”. This feature in combination with the remaining claimed structure avoids the prior art of record.

Claim 19 recites, in part, “at least some of the delay elements are linear phase filters”. This feature in combination with the remaining claimed structure avoids the prior art of record.

Claim 20 recites, in part, “at least some of the delay elements are lump delay circuits”. This feature in combination with the remaining claimed structure avoids the prior art of record.

Claim 21 recites, in part, "at least some of the delays arise from bandwidth limitations of the computational elements". This feature in combination with the remaining claimed structure avoids the prior art of record.

Claim 22 recites, in part, "delays arise from bandwidth limitations of connections among the computational elements". This feature in combination with the remaining claimed structure avoids the prior art of record.

Claim 23 recites, in part, "the time-varying signal is produced by a transmitter having a clock rate, the delay elements having an upper bandwidth limitation no greater than the transmitter's clock rate and cooperating to synchronize performance of the series of computational operations to the transmitter's clock". This feature in combination with the remaining claimed structure avoids the prior art of record.

Claim 24 recites, in part, "the computational elements are dynamically reprogrammable to carry out any of a plurality of computational operations". This feature in combination with the remaining claimed structure avoids the prior art of record.

Claim 25 recites, in part, "the delay elements are dynamically reprogrammable to impose any of a plurality of delays". This feature in combination with the remaining claimed structure avoids the prior art of record.

Claim 26 recites, in part, "interconnects between delay elements and computational elements can be dynamically reprogrammed to connect different delay elements to different computational elements". This feature in combination with the remaining claimed structure avoids the prior art of record.

Claim 29 recites, in part, "at least some of the delays are imposed by soliton delay elements". This feature in combination with the remaining claimed structure avoids the prior art of record.

Claim 52 recites, in part, "(i) the time-varying signal has one of a plurality of users as intended recipients, (ii) the time-varying signal is transmitted from one of a plurality of transmitters, each transmitter having a clock rate, (iii) **the receiving step is performed by one of the plurality of users** (emphasis added) and (iv) the state-based operations detect whether the user receiving the time-varying signal is an intended recipient". This feature in combination with the remaining claimed structure avoids the prior art of record.

Claim 55 recites, in part, "the analog delays and analog computational elements operate on the probability signals; (i) to remove high frequency noise from the probability signals; (ii) synchronize with the clock rate of the time-varying digital signal; and (iii) decode the time-varying digital signal". This feature in combination with the remaining claimed structure avoids the prior art of record.

Claim 56 depends from claim 55.

Claim 57 recites, in part, "noise-lock loop in electrical communication with the probability module and receiving the probability module outputted probability signals". This feature in combination with the remaining claimed structure avoids the prior art of record.

It is these limitations, which are not found, taught or suggested in the prior art of record, and are recited in the claimed combination that makes these claims allowable over the prior art.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

6 Any inquiry concerning this communication or earlier communications from the examiner should be directed to Douglas N. Washburn whose telephone number is (571) 272-2284. The examiner can normally be reached on Monday through Thursday 6:30 AM - 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John E. Barlow can be reached on (571) 272-2269. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

MICHAEL NGHIEM
PRIMARY EXAMINER

DNW